MEDICAL SCHOOL EDUCATION FOR WHOM, STUDENT OR PATIENT

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THIS ARTICLE HOLDS that medical-school education, now focused on students with patients for students' learning, ought to be changed to focus on patients as first priority and on what is best for patients' medical care, especially in the future. The patient comes first. Faculty and students must do whatever is necessary to achieve this end.

This conclusion is based on personal experience as a medical student. Upon retirement after 40 years in academic internal medicine and medical student teaching, it became apparent that only by experiencing and studying what happens at the student level could the defects in medical-school education be identified and corrective steps pointed out. Accordingly, with the consent of the faculty and the entering class, I became a full-time student (1975-1979) at State University of New York Downstate Medical Center, Brooklyn, New York, taking all requirements and chores in all courses that regular students took, including all examinations, written and oral, and National Boards Part I and II. Such action was necessary to understand the full impact of what students undergo. The decision proved to be correct. After taking the midyear oral and written examinations of the first year, students realized my sincere desire to undertake all that they did and accepted me as a fellow-student, not a "company plant" spying on them. Thereafter our interchanges and relationship became free and easy as I did my share and rigorously avoided any action that interfered with or deprived students of their learning or upstaged them or the instructors. Students came to express voluntarily their thinking, wishes, aspirations, and discontents with the teaching, faculty, and administration, not otherwise openly revealed. Obviously, my past gave me advantages that the students did not have. On the other hand, students had types of learning that I did not have. Mutual learning resulted.

Subsequent meetings (1979-1985) with students, faculty, and deans of 24 medical schools in the United States firmed up my thoughts, and raised issues that will not be discussed—selection, admission, residency, medical ped-

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agogy, and structure of medical education. These components of medical education are beyond the scope of this essay, which deals entirely with the experience and data obtained during the four years of medical-school instruction.

Students enter medical school with the view of medicine as practical patient care, compassion, social service, eagerness for prompt hands-on contact with patients, and no or little interest in medicine's scientific base. They do not understand that man is a biochemical, biophysical, biological machine; that biomedical science is basic to medicine and in the best interest of patients; that clinical medicine is the application of these sciences with clinical skill; that the more physicians know about biomedical sciences the more likely is disease prevented, cured when it occurs, and when that is not yet possible, then alleviated.[1,2] Knowledge of the biomedical sciences is even more essential for the future when physicians will become clinical biomedical scientists. Why then are the biomedical sciences undercut by the present overstress on clinical teaching and clinical activities?

Grossly unprepared students with totally inadequate biomedical-sciences preparation are foisted on patients. The experience titillates, not educates. Personal experience as a patient interviewed by five first-year students demonstrated the futility of such activity. Their questions were aimless and meaningless. Nothing of medical or psychological value could have emerged.

Teaching: biomedical-science years. It is in the patients' interest to devote the first two years to the biomedical sciences[3] and to promote them more actively in the clinical years. Designate the first two years for what they are, biomedical science-medicine years or bioscience-medicine years; not preclinical years, a term that connotes something preliminary and secondary to the main purpose. The point is not trivial. Words are powerful. Their connotations determine thinking and action. Biomedical sciences are medicine and students need to understand that they are learning medicine.

Students' antipathy toward biomedical sciences stems from their negativity to the college competition for high science grades needed to get into medical school. Inadequate preparation in the sciences results. After admission this negativity transfers to the biomedical sciences with their analytical nature, their reputation as tough, flunking courses (biochemistry especially), and the students' image of bioscience faculty members as researchers irrelevant to patient care. The inadequately prepared spread their negativity to the well prepared. Teaching both groups together, the material is beyond one group, bores and deprives the other, alienates both from biomedical sciences. Medical school applicants are responsible for being fully prepared. It is not medical schools' function to provide remedial instruction and dilute their resources, or to give watered-down courses. Their responsibility is to state

clearly the required preparation. Then it is up to the applicants and their colleges to meet it.

Faculty members reinforce students' antipathy toward biomedical sciences: give more curricular time to clinical courses; intrude on science instruction with clinical sessions; grant a fully elective fourth year; leave less time to learn the growing bioscience information. Students interpret all this to mean that clinical studies are the important ones, biomedical sciences secondary.

Students maintain that biomedical sciences should be taught concomitantly with clinical medicine right from the start. Some clinical departments agree, assert that they teach the needed biomedical sciences during clinical instruction. Not so. They apply the biomedical sciences learned in the first two years. Moreover, such teaching is secondary to clinical care, and bioscience has marked variations between departments and instructors. Moreover, both students and faculty members disregard the overload and resultant superficiality of trying to learn both disciplines at the same time.

Integration of biomedical sciences and clinical medicine is necessary in all four years to break the barrier between the two. During the first two years, both faculties need to participate jointly in correlated sessions in which science faculty members teach the basic biomedical sciences and clinical faculty members discuss the biochemical, biophysical, and physiological events in patients. The immediacy of such correlations enhances learning biomedical sciences. The joint sessions would replace the usual correlation clinics given separately by clinicians dwelling on clinical aspects not understood by unprepared students. They entertain, not instruct. Moreover, qualified clinical investigative faculty members can participate in curricular biomedical science courses, and bioscience faculty members in clinical teaching, in departmental grand rounds, seminars, and patient rounds. Students will come to understand the oneness of biomedical sciences and clinical medicine.

Instruction concentrates on students and "facts," not patients. Students rightly criticize the "fact"-filled lectures and rote learning of the biomedical sciences; stay away (attendance 50 to 60%); study lecture "handouts" and student-recorded transcripts of lectures. There is no questioning, innovating, and developing responsibility for the self-education needed for the rapidly changing medicine of the future. Teaching is not simply transfer of information. Problem-solving is the basis of medicine and needs a primary commitment in all teaching. Students are wrong to attack the biomedical sciences, right to attack how they are taught.

In the first two biomedical science years replace many lectures by designated reading for primary information, followed by seminar discussions with instructors and the solution of predistributed problems. Strengthen participa-

tory hands-on learning in laboratories, now reduced in number, spottily attended, made elective, or omitted altogether. With both of these changes students become actively responsible for their education, not simply passive listeners to lectures. Doctoral candidates make good teachers for the added instructors needed.

Teaching: clinical years. Teaching of the biomedical sciences can profit from the teaching in the clinical years: the fewer lectures, responsibility for hands-on learning with designated patients, small group problem-solving sessions with preceptors, personal interaction in the student-patient-teacher triad, attention to one subject at a time, and more adequate time for study. Students' positivity replaces former antipathy.

But the focus is students, not patients. Teaching centers on laboratory tests ("the numbers") and special procedures. This biomedical-sciences medicine has almost replaced patient history and physical examination medicine. Certainly diagnosis and extent of disease are better defined and treatment guided more effectively, but patients as people are neglected. Preceptors do not observe, aid, or correct students as they take histories, perform bedside tests, or determine how they interact with patients.

Set routines replace thinking. The database is typical. Students react to listed items, do not take the initiative to produce information. Preceptors do not verify with patients the accuracy or fullness of content. Information is lost. Filling out database sheets becomes the aim, not care for patients. Obviously, both biomedical-science medicine and clinical medicine are essential and complementary. Such is not the case: it is the test results that are diagnosed and treated.

Diagnosis tends to be a reflex routine. "Problems," actually symptoms, signs, and bedside tests are recorded. A list of "rule-outs" not diagnosis(es) is made for each, and many, necessary or not, tests and special procedures are immediately ordered until by exclusion a diagnosis(es) is (are) backed into, a little-thinking, costly process that discounts the patient. Reinforce the narrative, patient-elicited, account of illness that necessitates personal listening to patients, reveals information otherwise lost, and directs tests and procedures as needed, not reflexive ordering.

Students are taught "fact"-oriented, test dependent, costly medicine that relies more on technologists who do not know or have responsibility for patients than on physicians. Studies of the high cost of medical care, present and especially future, need to examine how medical students are taught. Studies of current medical costs are too late to correct ingrained medical practices and governmental dicta.

The *New England Journal of Medicine* has published widely on the cost of medical care. The *Journal* has not addressed the problem at the level of medical-school education. The weekly reports of the clinicopathological conferences give it the opportunity to do so. These reports are widely read, and influence medical students, interns, residents, and faculty members. It would be educational to give for each presentation the medical costs incurred, both as a total and itemized into physicians' fees, hospital charges, laboratory costs, medical procedures and treatment, including surgery.

The fully elective fourth year, intended to give students responsibility for their education and to learn the medicine that occurs in patients in their daily lives, fails its purpose. Electives chosen are short, usually one month in specialties, deal with clinical practices and have little biomedical science or research. Substitute internships are common, a practical, too administrative, activity that belongs in the postgraduation hospital period, not in medical school, where the time and effort can be more profitably spent. Ambulatory (clinic) medicine including both general internal medicine and specialty medicine ought to be a fourth-year-long requirement, with students following in the hospital the patients admitted. With hospitalizations concentrating on emergencies, major surgery, and complex technological procedures, preventive and nonemergency medicine are shifted to ambulatory settings. Student education must adjust accordingly. Moreover, contact with patients in their usual circumstances teaches psychological and social aspects of medicine.

In all four years of teaching a serious shortcoming is failure to examine what we do not know, our ignorance.[4] As a result, students are led to think that what they are taught is unalterable "fact."

Self-education. Continual self-education is essential for ever-changing medicine. It develops reasoning, honing judgment and learning to deal with uncertainty, a basic in medicine. All are given insufficient attention in the concentration on "facts" and current procedures.

Reading is deterred by the huge, 2,000-plus page, costly textbooks full of "facts" and without problem-solving. Students turn to paperback compendia, manuals, and multiple-choice-test question paperbacks for quick answers. Rapid advances in medicine make textbooks ephemera. Why not rent textbooks and have departments supply syllabi of problems?

Reading journals and forming the habit of remaining abreast of advances in biomedical sciences and clinical medicine is not fostered. Some medical journals have become advertising media for medically related industry. For example, a weekly medicine journal had 86 pages of advertisements, mostly multicolored and chiefly of drugs, and 68 pages of medical articles; a monthly

medicine journal had advertising 102 pages, medical articles 184 pages. Symposia are separately published, oriented, usually favorably, to a drug produced by the company funding the issue. By such advertising and by financing trials of its products, medical industry skews medical education and patient care. Of course, medical industry is indispensable for good patient care, but this aim is guided by monetary concern and financial return for stockholders.

Audiovisual aids, like textbooks, are "fact"-oriented, have no questioning or problem-solving. They lure students away from patients and laboratories. They are useful in preparing for hands-on learning in the laboratories of the biomedical sciences and they ought to be mandatory to illustrate the techniques of physical diagnosis and medical interviewing before students are imposed on patients.

Instruction by computers has a place in ready access to information, the value of which depends on source and currency. There can be learning and problem-solving when programs require analysis in reasoned steps; give background information and references; compare students' steps and conclusions with the computers' experts; grade the performance; and, for clinical problems, compare the costs incurred for the solution with the computers' experts. However, the process is too largely a reaction to listed choices and does not elicit self-possessed knowledge.

Instruction by computer draws students away from laboratories and patients. Computers cannot teach realities as do laboratories, and certainly not the clinical knowledge and skills that come only from studies with patients. Nor can computers determine that the information and skills are present when the "correct" keys are punched. Rote steps and the computers' always "right" answers promote dogmatism, deter questioning and innovating, and lead to boredom. Satisfying the computer replaces learning. Computers have their place for abstract learning. What is needed is more student input, questioning, and balance between machine-learning and first-hand learning in laboratories and with patients. And discard the notion that computers are always right.

Medical ethics. Ethics belongs in all stages of medical education. A review of the fundamentals of ethics belongs in the first-year medical-school curriculum. The second year adds ethics in biomedical sciences, clinical medicine and the social professions. All have a part in patient care. Participatory seminars, not lectures, are the teaching mode. In both years, requiring students to record and submit their thoughts leads to examination of themselves and their values, practices, and biases, their ethics.

Concern for patients as people needs to be instilled from the start. From day one medical school matriculants are not simply students but student-

physicians, and their deportment ought to be what patients expect of physicians in their offices; good grooming, appropriate dress, jackets (white in clinical years), and tie. Why do faculty condone the untidiness, in some instances bordering on slovenliness, present during the first two years?

In all four years students receive preference over patients. Students are given patient activities as early as the beginning of the first year "to learn about patients as persons." But the focus is on students, not patients. Without preparatory studies students cannot grasp medical problems and their physical and mental effects on patients. Patients are exploited and can be alarmed by statements and clumsily attempted examinations by unprepared students (personal observations). Faculty members are not present to witness such occurrences. Asking students whether they can rightfully be imposed on patients, one student replied; "that's the *price* they pay coming to a teaching hospital." Wrong medical ethics is thus initiated; students first priority, patients for students' learning.

Medicine cannot be learned without imposing students on patients. Learning with patients is not a right. It must be earned by first acquiring the background biomedical-science, behavioral and ethical knowledge needed to comprehend what patients present. *Then* the price patients pay can be ethically justified. And not before.

During the clinical years house-officers, primary teachers of students, consider their training first. Patients as people are overlooked. Faculty members fix on current information. When the occasion arises, patients are just referred to psychiatry or social service, usually without follow-up. The neglect of the patient as a person is not by intent, but bad habit. Certainly there are clinical faculty members who exemplify concern for patients. More are needed.

Society exerts a major role in the poor medical ethics it decries. Medical students are influenced by its example: the focus on me first, money, self-aggrandisement, power, hedonism, and medicine as an industry with patients secondary to monetary considerations. Medical schools face a major decision. Are they to teach for a future in which the industrial format prevails: patients as impersonal beings moved along by specialists and technologists, receiving fragmented care without a physician coordinating the process and responsible for the patient? We are steadily moving in that direction. Or shall medical schools actively counter that trend: teach students to consider patients first and always as human beings?

Psychological history. Psychological history ought to be a required and separate rubric in the medical record. That will obligate students, residents, and faculty members to become involved with patients as persons. The key is listening, a skill to be learned like all clinical skills. Patients will then reveal how their illnesses affect themselves, their activities, and their relationships

with others. They will become partners with physicians in their own care, not just followers of directions. Students will learn about themselves, and begin to develop good medical ethics. The importance of psychological factors has been well established.[5,6] Medical-school teaching has lagged. A required psychological history can hasten correction of an important deficit.

Matching plan. The fourth year is not the peak of learning and education that it should be. Part II of the National Board of Medical Examiners interrupts briefly, but above all else students' overriding attention is to internship hunting, a mind and time consuming, costly, noneducational disruption that ruins the year. Resident Matching Plan announcements in mid-March effectively end the year. Learning slows, even stops. Desirable changes would limit students' applications to a realistic number (four) that calls for self-evaluation; reduces paperwork, hospital visits, and costs. Accept no applications before February first so that the critical fourth year performance can enter into the evaluation. Announce results in May, enough time for computers, mails, and relocating. Make the fourth year a year of real learning.

Cultural learning. Students want more than biomedical science and clinical medicine, evident in such statements as: "I need my music," "I write poetry." Medical education needs cultural and humanistic studies. Medicine cannot afford to neglect their values. Such studies will lead to enriched and broader patient-oriented physicians. Cultural education and medical education are not exclusionary but complementary. William Carlos Williams wrote his poetry while practicing pediatrics in New Jersey. Albert Einstein was a violinist and studied Bach. Medical schools have access to the arts and humanities departments of their universities and colleges and thus the opportunity to conduct integrated cultural programs beneficial to both.

Evaluation. Changing the examination process is the most pressing and important key to improving medical school education. Examinations determine what students study, how they study, what they learn, and their education. Examinations also determine what is taught and how it is taught. The current evaluation process is "fact" and student-oriented, not patient-oriented.

The multiple-choice-question examination is the actual determinant for passing (? knowledge). It does not determine medical competence. It is entirely reactive; tests instant recognition and recall to presented statements, not self-possessed knowledge; asks only for "facts"; neglects how to function with uncertainty, a basic in medicine; has no problem-solving; cannot evaluate actual laboratory and clinical knowledge and skills; clinical questions cannot be properly answered without patient contact; disregards patients

and medical ethics; is a true-false question examination that credits only preselected choices and ignores other correctly known choices; invites game-playing; "correct" guesses count as knowledge; promotes illiteracy by excluding writing, grammar, even spelling; tests rote acquisition rather than thinking and learning. Knowledge and ability are not fairly tested. Why persist with it?

National Board Examinations I and II exemplified all these faults and add another, haste. They required reading, understanding what was asked, deciding and answering each of the four to five components of the many questions in 11 to 12 seconds. No time to think, just react to a stimulus.

A valid evaluation would test the many-sided aspects of knowledge and ability and include for all courses: written examination of factual knowledge that tests self-possessed information and concepts by direct questions, and includes problem-solving in essay format; preceptors' evaluations—subjective and variably reliable—to test knowledge in laboratories in the biomedical-science years and of medicine in the clinical years; oral examination by two other than immediate preceptors to test ability to reason in problem situations; practical examination dealing with laboratory material in the first two years and with history taking, physical examination, diagnosis, and treatment of a previously unmet patient in the clinical years; written report, content left to the student, of ethics in individual sciences in biomedical-science years and the observed ethical behavior toward patients in the clinical years; written substantive paper at the end of the fourth year on a subject of the students' own choosing to conform with other doctorate degrees in requiring a final exposition.

The testing is not overly taxing. The written, oral, and practical components are taken over two half-days at the end of courses. Preceptors' evaluations occur during courses and require no additional effort. Medical ethics reports and final paper are written over months as students determine.

The testing gives faculty members a more correct evaluation of students. Students have the satisfaction that their abilities have been fairly judged. Criterion grading to a standard, minimum 70%, with effective weighting of each component is necessary throughout. Patients deserve better than evaluation by a normative (average) standard and surely more than the mediocrity of "pass/fail." Moreover, students deserve what they have earned.

Medical-school year. Rapidly growing increases in medical knowledge have made the nine month medical-school year an obsolete hang-over from the past. Holidays shorten instruction to eight months. The insufficient time to learn promotes tension. Memorizing replaces learning and education.

Teaching becomes expounding current "facts" and practices, many of which will be outdated when students become the medical-scientist physicians of the future.

There needs to be time to think. Lengthen the school year to at least 10, better 11, full calendar months. With holidays, instruction is nine or 10 full months. The first, second, and third years would be the full calendar months of September through July, the fourth year nine calendar months of September through May; a one month vacation conforms with normal adult practice. The shorter nine month fourth year is acceptable since the major clinical learning is during hospital house officerships. With such school years students will be less harassed, learn more, and be better prepared for the continual self-education needed for the future. The change is in patients' interests. They will be treated more competently.

The effort now spent on the many analyses of the present educational format can be better spent in devising better ways to increase student input, questioning, responsibility for self-learning of new science and clinical knowledge as they develop, learning how to cope with uncertainty, and more attention to patients as people.

The failings discussed contain in them each the corrective positives. Do not dismiss the failings by, "they do not happen in my school." They are present in varying degrees in all medical schools. Examine what actually goes on at the student level. Only then can medical-school education oriented toward patients be improved. Much now is not what faculty think or wish. Implementation of the observation and thoughts expressed in this report rests with medical schools, each carrying out what is best within its unique circumstances and resources. The resulting diverse solutions are desirable, promoting the discussions and examinations necessary in all education.

SUMMARY

Replace current student-oriented medical school teaching by a patient-focused education. Strengthen biomedical sciences, essential for the biomedical-scientist physicians of the future. Patient activities before biomedical science, behavioral and ethical studies do not educate: they exploit patients. Replace lectures of the first two years by students' designated reading followed by seminars and problem-solving. Current passive "fact"-oriented teaching needs change to one of student input, questioning, learning to cope with uncertainty, and taking responsibility for one's education. Ethics belongs in the curriculum and psychological history in medical records. Examinations determine teaching. Replace the multiple-choice-question

examination with an evaluation that tests wide medical knowledge and includes a final thesis. Replace normative and pass/fail grading with criterion grading to a standard of excellence. Replace the obsolete nine months school year—with holidays only eight months of instruction—by 11 full calendar months, with holidays 10 full months of instruction.

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